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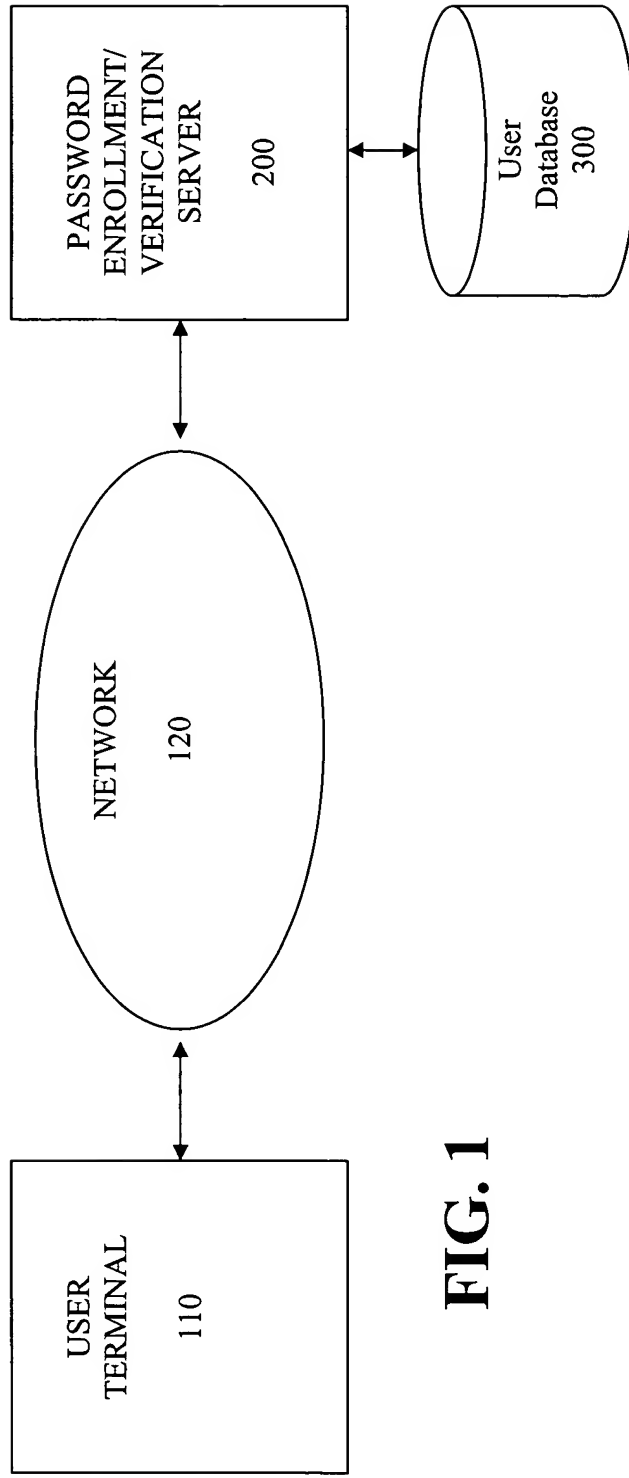


FIG. 1

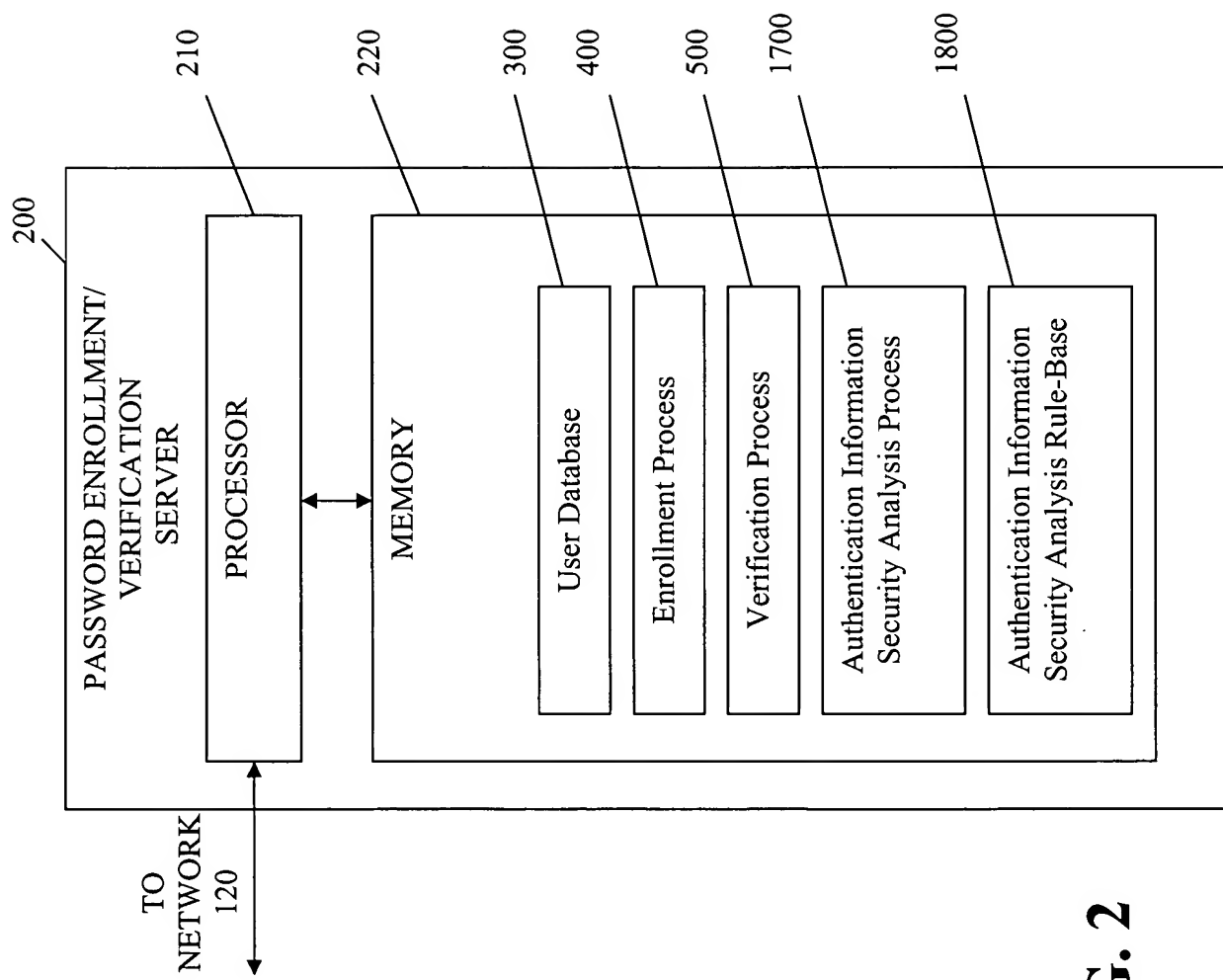


FIG. 2

USER DATABASE -- 300

	USER NAME 330	PASSWORD (ANSWER) 340	REINFORCEMENT (HINT) 350
305	John Smith	718-555-1212	Mandy's Phone Number
310	...		
315	Jon Bentley	People: Father, Mother, Sister, Brother Car: Blue 1965 Mustang Trip: From Home to Fresno via Highway	Sandy Koufax's Perfect Game
320	Jill Doe	12/12/68	Fido's Owner's Birthday

FIG. 3

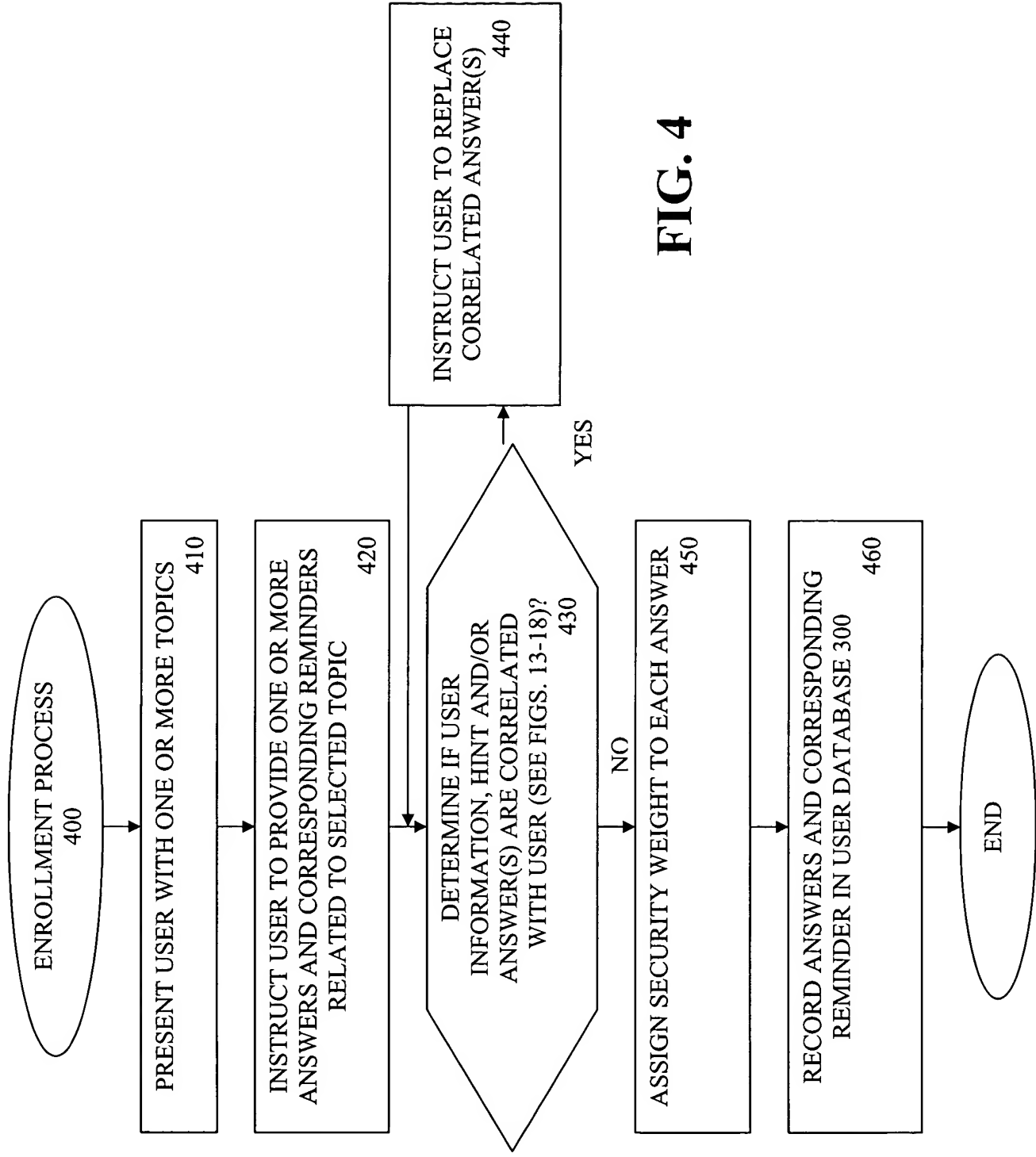


FIG. 4

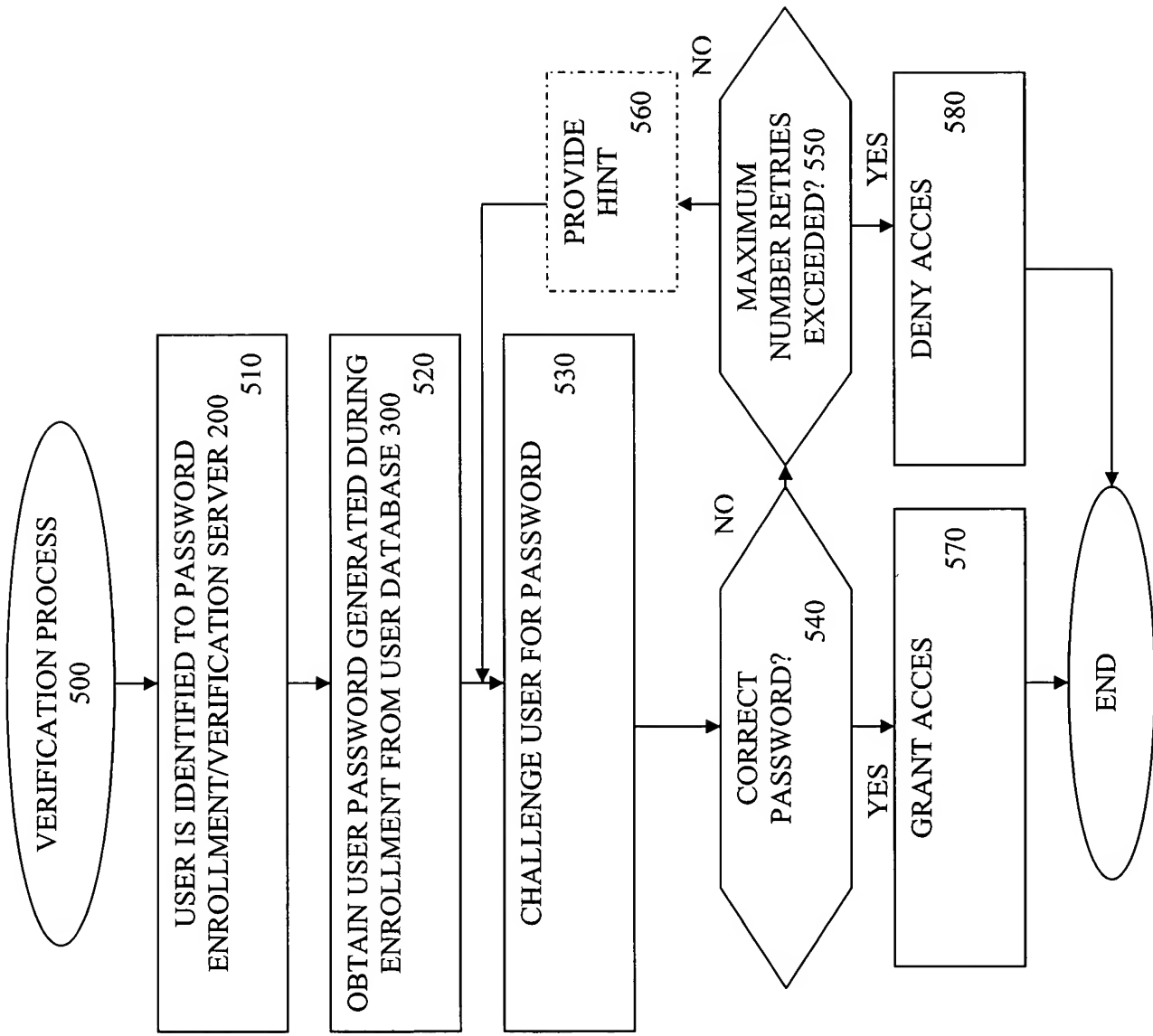


FIG. 5

600

Authentication Registration - 3/1/2001 11:11

Welcome. This program will help you choose a "secret number" to identify yourself. Please choose one of the methods.

Personal History

Use this if you remember phone numbers, street addresses, and the like.

Key Events

Use this if you have vivid memory of past events, such as the First Moon Walk or the Tragedy of September 11, 2001.

Personal Preferences

Take a brief quiz about your likes and dislikes, then log in later by answering these questions.

Make Your Own Number

Make up your own secret number.

Random Number

The system will generate a secret number, and then help you memorize it.

Exit

610

FIG. 6

FIG. 7

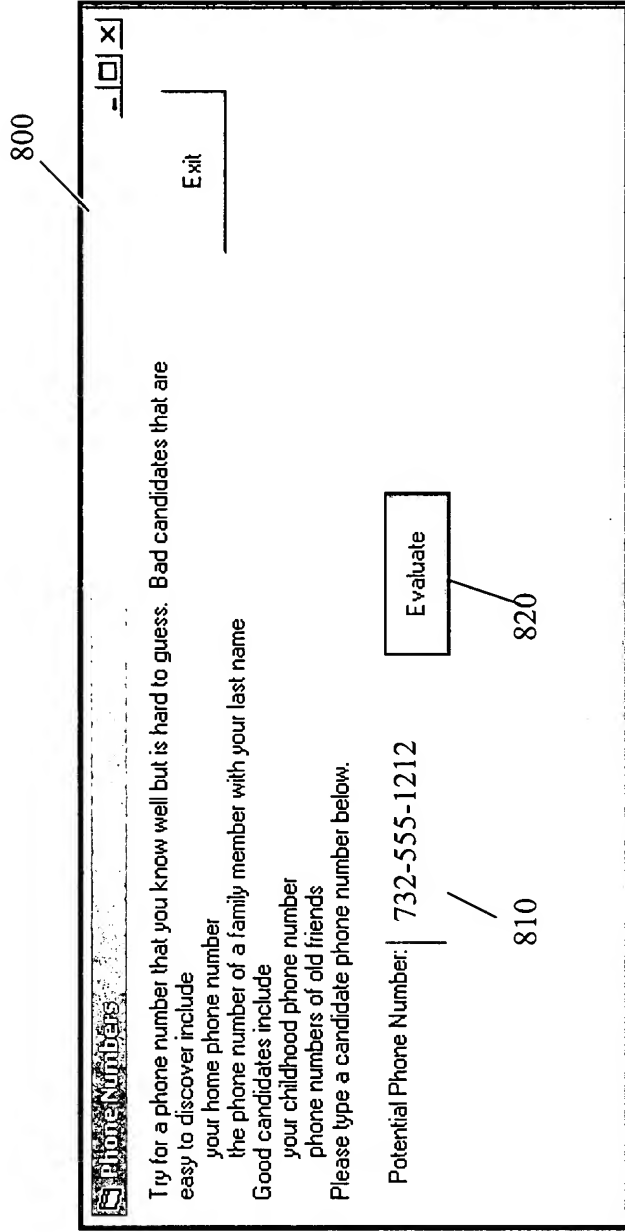
710

700

Personal History	
Try to find numbers that you know very well, yet are hard for attackers to discover.	
Phone Numbers	Try this if you know many phone numbers.
Street Addresses	Try this if you know street numbers, zip codes, or PO Box numbers.
Dates	Try this if you know important personal dates.
Numbers from Facts	Try this if you know numbers such as the length, width or height of certain objects.
Identification Numbers	Try this if you once memorized an ID number that you no longer use. (Warning: Social Security numbers are not accepted.)
Other Numbers	Try this for other numbers, such as model numbers, scores of sports events, etc.

Exit

FIG. 8



Phone Number Text [] [X]

Try to find a reminder that is easy for you to recognize yet hard for others to guess. Bad reminders that could help an attacker include

Fred Jones in Boca Raton
my brother in Aspen

Good reminders mean a lot to you, but little to other people:
Fluffy and Rover's house (pets' names)
Susie and Jimmy's old house (children's names)

If you can think of a good reminder, type it in below and press Evaluate.
If you need help, press for assistance.

Phone Number: 718-555-1212

Potential Reminder: Mandy's Phone Number

Tests passed. 910

If you are comfortable with this reminder, proceed to the next step.
If you are not comfortable, try another reminder.

Evaluate

920

Finish the Process

Exit

FIG. 9

1000

FIG. 10

Problem with Phone Number

Exit

The system has found potential problems with this phone number, which are explained below. Click the button by the problem for more information.

Tell Me More

Directory search shows that number belongs to Jon Bentley of New Providence, NJ

1010

1100

FIG. 11

Problem with Phone Number

Exit

The system has found potential problems with this phone number, which are explained below. Click the button by the problem for more information.

Tell Me More

Directory search shows that number belongs to

P. Smith

of Berkeley Heights, NJ

1110

Tell Me More

Web search finds strong associations between

J. Smith and P. Smith

Tell Me More

Web search for

J. Smith find P. Smith in top 5

1112

Registration Completion

Secret Number: 718-555-1212

Reminder: Mandy's phone number

1010

1020

Exit

Many people find it easier to remember their secrets if they receive periodic reminders. Please indicate below what, if any, reminders you wish to receive.

E-Mail Reminders

E-Mail Address:

user@mail.adr

Frequency of Reminders

☐ Weekly
☒ Monthly
☐ None

☐ Check here to receive the secret number along with the reminder.

Telephone Reminders

Telephone Number:

Frequency of Reminders

☐ Weekly
☐ Monthly
☒ None

1040

Telephone reminders do not give your secret numbers.

Done

FIG. 12

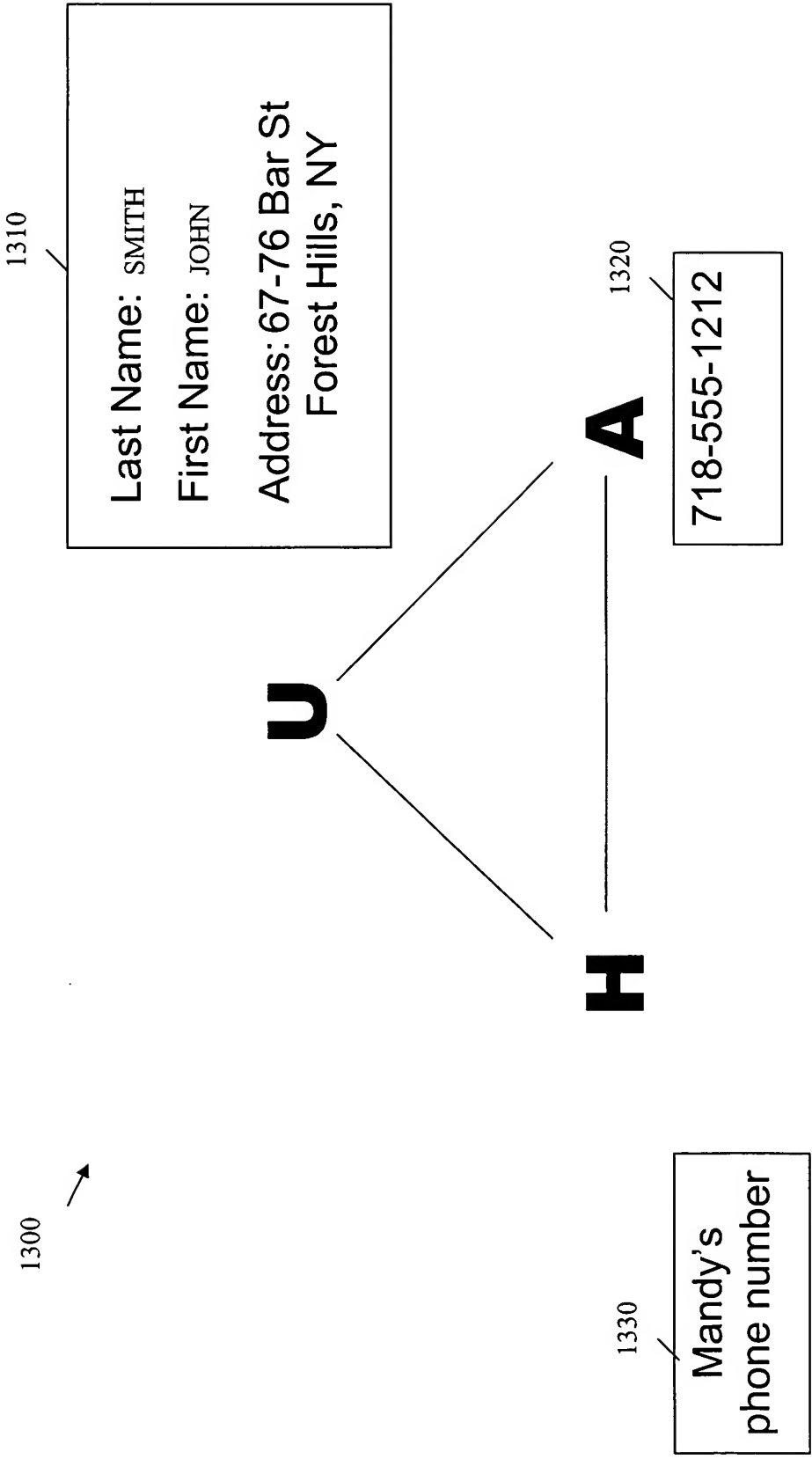


FIG. 13

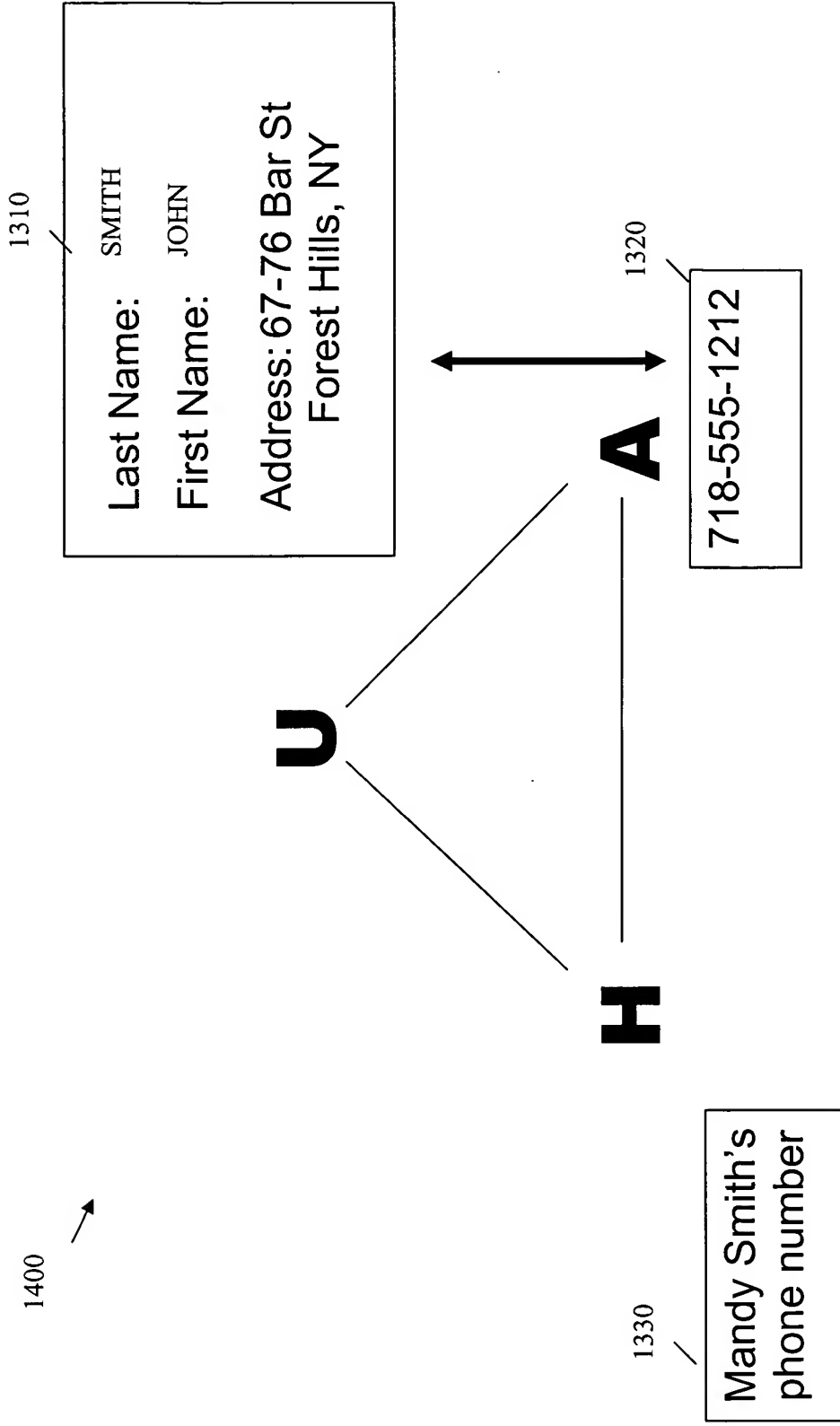


FIG. 14

1500 →

1310

Last Name: SMITH
First Name: JOHN
Address: 67-76 Bar St
Forest Hills, NY

U

H

A

1330

Mandy Smith's
phone number

1320

718-555-1212

FIG. 15

1600



U

H

A

1330

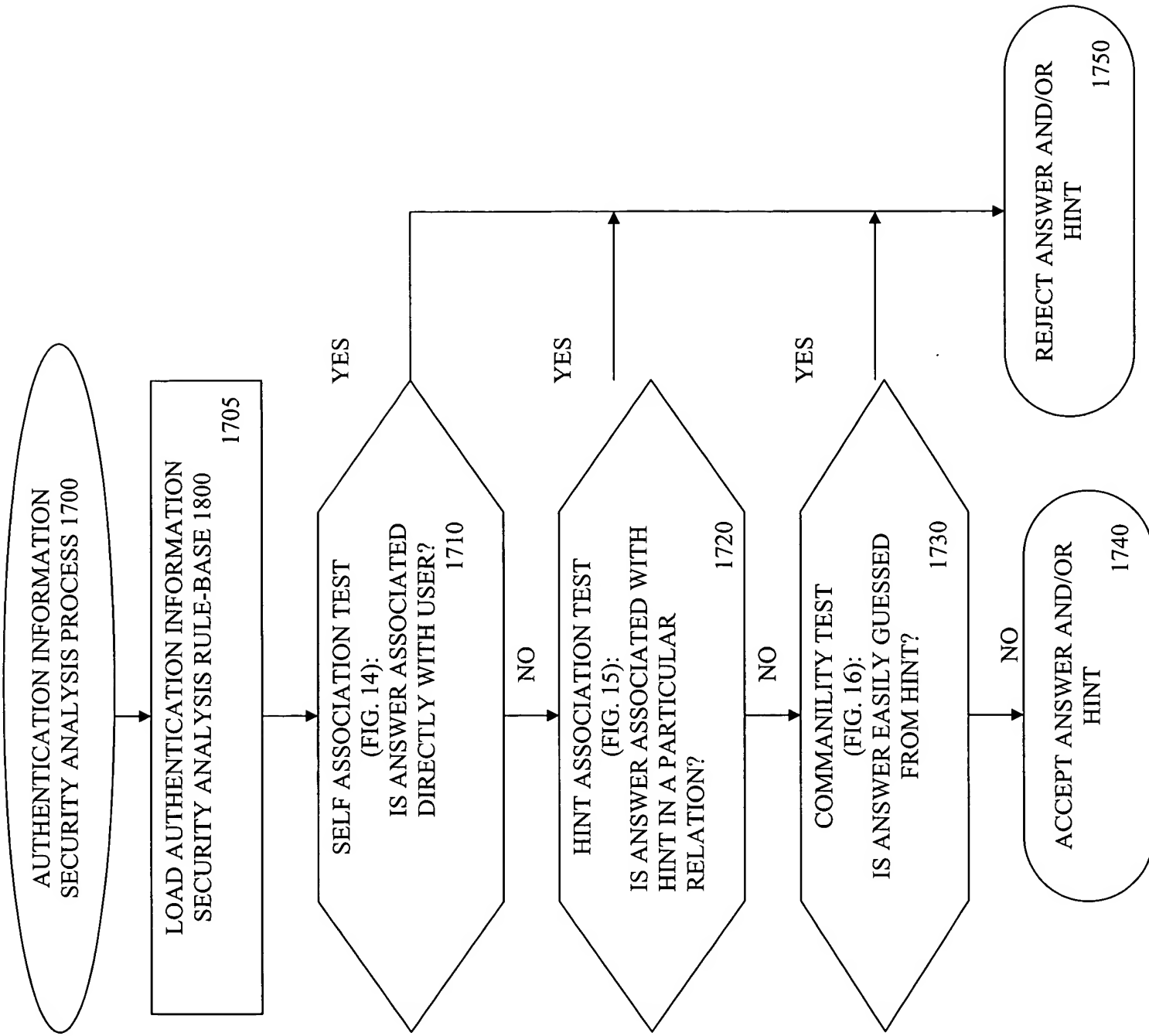
Popular Airline's
telephone number

1320

800-221-1212

FIG. 16

FIG. 17



AUTHENTICATION INFORMATION SECURITY ANALYSIS RULE-BASE 1800

	Rule Name 1830	Rule Type	1840	Rule Condition(s) 1850
1810	User Telephone Number	Self Association		Is user owner of proposed telephone number?
1811	Word Association	Self Association		Is user strongly associated with proposed word?
1812	Hint Related to User	Hint Association		Is person associated with proposed hint in a particular relation with user?
...				
1820	Common Telephone Number	Commonality		Is popular business entity owner of proposed telephone number?

FIG. 18

	<none>	compilers	pearls	image
Author A	13400	8560 64%	174 1%	921 7%
Author B	10700	480 4%	4670 44%	692 6%
Author C	2110	34 2%	3 0%	915 43%

FIG. 19